

## **REMARKS/ARGUMENTS**

Claims 1-16 were previously pending in the application. Claim 3 is canceled; claims 1, 4, 8, 12, and 13 are amended; claims 15 and 16 are cancelled; and new claims 17-19 are added herein. Assuming the entry of this amendment, claims 1, 2, 4-14, and 17-19 are now pending in the application. The Applicant hereby requests further examination and reconsideration of the application in view of the foregoing amendments and these remarks.

### **SECTION §112 REJECTIONS**

In paragraph 2 of the office action, the Examiner rejected claim 16 under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement because this claim is a single-means claim. Claim 16 is cancelled herein, thereby rendering moot this rejection.

In paragraph 4 of the office action, the Examiner rejected claims 4, 8, 12, 13, and 14 as being indefinite. In response, the Applicant has made the following amendments.

Claim 4 is amended herein to change " $m(e)$ " to  $--F(e)--$ .

Claim 8 has been amended to remove the unnecessary recitals with respect to indices  $i$  and  $j$ .

Claims 12 and 13 have been amended to change the phrase "dual feasibility constraints" to "--dual network constraints--". The specification paragraph beginning at page 13, line 2, has also been amended to change the phrase "dual feasibility constraints" to "--dual network constraints--". The Applicant notes that the terms "dual feasibility constraints" and "dual network constraints" previously used in the specification and claims are not two different sets of constraints, but rather, are intended to mean the same thing.

For clarity, claim 12 is also amended herein to remove the term "a relative minimum" and replace it with language supported by the specification at page 11, lines 8-15. Step (a) of claim 12 now recites "determining a link  $\bar{e}$  and a corresponding shortest path  $P$  that minimize a combination of i) a sum of a set of shortest-path link weights of the corresponding path  $P$  when  $\bar{e}$  fails and ii) a sum of the link weights when each other link not in the corresponding path  $P$  fails."

Claims 13 and 14 were rejected solely because of their dependencies on claim 12, and the foregoing amendments to claims 12 and 13 are believed to overcome the indefiniteness rejection of claims 13 and 14.

It is believed that the foregoing amendments to claims 4, 8, 12, and 13 overcome all of the pending rejections under 35 U.S.C. 112, second paragraph.

### **ART REJECTIONS**

In paragraph 6, the Examiner rejected claims 1-3, 5, 6, 11, 15, and 16 as anticipated by U.S. Patent Application Pub. No. 2002/0071329 ("Grover"). In paragraph 8, the Examiner rejected claims 7 and 9 as obvious over Grover.

For the following reasons, all of the now-pending claims are allowable over Grover:

Claims 1, 2, and 4-14

Claim 1, as amended, recites that the network constraints include:

- 1) for each link, a set of one or more detour paths exist whose capacities sum to the working capacity of the link;
- 2) for each link, the sum of the working capacity and the restoration capacity shared by the set of one or more detour paths is, at most, a total capacity of the link; and
- 3) the working capacity of the network is maximized.

Support for this amendment is found in previously-pending, now-cancelled claim 3. In rejecting previously-pending claim 3, the Examiner states that Grover discloses the Applicant's constraint 2, namely, "for each link, the sum of the working capacity and the restoration capacity shared by the set of one or more detour paths is, at most, a total capacity of the link," citing to Grover's constraint (2), as set forth in paragraphs [0021] and [0022] of Grover. This is not the same as the Applicant's constraint 2. Grover's constraint (2) is:

$$\sum_{q \in Q^r} g^{rq} = d^r \quad \forall r \in D$$

As explained in the reference table between paragraphs [0020] and [0021] of Grover, the variable  $g^{rq}$  represents working capacity assigned to the  $q^{\text{th}}$  eligible working route for demand pair  $r$ , and the variable  $d^r$  represents the number of demand units for O-D pair  $r$ . Therefore, Grover's constraint (2), which, according to Grover, "ensure[s] that all working demands are routed," merely states that the working capacity for a given demand pair is equal to the demand for that pair. To the contrary, equation (8) of the Applicant's specification provides an example of the Applicant's constraint 2, as follows:

$$\sum_{P: P \ni P_e} f(P) + \sum_{P: P \ni P_f, r \in P} f(P) \leq u_e \quad \forall f \neq e, \quad e, f \in E \quad (8)$$

This constraint states that "the working capacity on link  $e$  plus the restoration capacity that appears on link  $e$  due to failure of link  $f$  ( $f \neq e$ ) is at most the capacity  $u_e$  of link  $e$ " (specification, at p. 11, lines 9-12). As can clearly be seen, constraint (2) of Grover does not disclose any such constraint. Nor do the other portions of Grover cited by the Examiner, nor is such a constraint found anywhere else in Grover. Since Grover does not disclose a network constraint wherein "for each link, the sum of the working capacity and the restoration capacity shared by the set of one or more detour paths is, at most, a total capacity of the link," Grover cannot anticipate claim 1.

For these reasons, the Applicant submits that claim 1 is allowable over Grover. Since claims 2 and 4-14 depend variously from claim 1, it is further submitted that those claims are also allowable over Grover. The Applicant submits therefore that the rejections of claims under Sections 102 and 103 have been overcome.

Claim 8 and New Claim 18

Claim 8, as amended herein, recites, *inter alia*, that the path-indexed LPP formulation is given by:

$$\max \sum_{e \in E} \sum_{P: P \ni P_e} f(P), \text{ subject to}$$

$$\sum_{P: P \in P_e} f(P) + \sum_{P: P \in P_f, e \in P} f(P) \leq u_e \quad \forall f \neq e, \quad e, f \in E$$

where “max(•)” denotes the mathematical “maximize •”,  $E$  denotes a set of links in the network,  $e$  and  $f$  are links in the network,  $u_e$  denotes the capacity of link  $e$ ,  $P_e$  denotes the set of all paths  $P$  that do not contain link  $e$ , and  $f(P)$  denotes the restoration traffic on a given path  $P$  after failure of the link that it protects.

Nowhere does Grover teach, disclose, or even suggest these recited features of claim 8, and it is therefore submitted that Grover cannot render obvious claim 8. The Applicant also notes that the Examiner indicated that, due to the pending §112, second paragraph, rejection of claim 8, the “claim 8 language is unclear and indistinct to such an extent that it is impossible to search for prior art. However an absence of prior art should not be construed as indicating allowable subject matter.” While the Applicant respectfully disagrees that the recitals of indices  $i$  and  $j$  in previously-pending claim 8 ever actually created an indefiniteness issue, the Applicant has amended claim 8 to remove all references to indices  $i$  and  $j$ . No prior art references were cited against previously-pending claim 8, and amended claim 8 is now believed to be allowable.

For similar reasons, the Applicant submits that new claim 18, which is equivalent to previously-pending claim 8 rewritten in independent form, is also allowable.

#### New Claims 17 and 19

In paragraph 9 of the office action, the Examiner indicated that previously-pending claims 4 and 10 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

New claim 17 is equivalent to previously-pending claim 4 rewritten in independent form, and new claim 19 is equivalent to previously-pending claim 10 rewritten in independent form.

Since the Examiner stated that previously-pending claims 4 and 10 would be allowable if rewritten in independent form, the Applicant submits that new claims 17 and 19 are allowable.

In view of the foregoing, the Applicant submits that the rejections of claims under Sections 102 and 103 have been overcome.

In view of the above amendments and remarks, the Applicant believes that the now-pending claims are in condition for allowance. Therefore, the Applicant believes that the entire application is now in condition for allowance, and early and favorable action is respectfully solicited.

#### Fees

During the pendency of this application, the Commissioner for Patents is hereby authorized to charge payment of any filing fees for presentation of extra claims under 37 CFR 1.16 and any patent application processing fees under 37 CFR 1.17 or credit any overpayment to Mendelsohn & Associates, P.C. Deposit Account No. 50-0782.

The Commissioner for Patents is hereby authorized to treat any concurrent or future reply, requiring a petition for extension of time under 37 CFR § 1.136 for its timely submission, as incorporating a petition for extension of time for the appropriate length of time if not submitted with the reply.

Respectfully submitted,

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